REMARKS

Applicant appreciates the thorough examination of the present application in the Office Action of March 8, 2004 (hereinafter "Office Action"). Applicant has amended Claims 48 and 96 to correct minor typographical errors. Applicant respectfully traverses the rejections of the claims for at least the reasons discussed below.

Independent Claims 1, 16, 45, 48, 67, 90 and 93 are patentable over Sakoda

Independent Claims 1, 16, 45, 48, 67, 90 and 93 stand rejected under 35 U.S.C. § 102 as anticipated by U.S. Patent No. 6,519,292 to Sakoda et al. (hereinafter "Sakoda"). Applicant respectfully traverses these rejections, as Sakoda fails to disclose several of the different recitations of these claims.

Independent Claim 1 recites:

> A communications system for communicating with a plurality of terminals, the system comprising:
> a network station;
> a *variable error correction encoder that error correction encodes respective bitstreams for respective ones of the plurality of terminals according to respective selected coding rates of a plurality of coding rates*;
> a *variable symbol generator that maps respective ones of the error correction coded bitstreams to respective symbol streams according to respective signal constellations of a plurality of signal constellations of various orders*;
> a variable spreader that spreads the respective symbol streams according to respective orthogonal spreading codes of a plurality of mutually orthogonal spreading codes of various lengths;
> a transmitter that transmits the spread symbol streams from the network station in a communications medium; and
> a controller, operatively associated with the variable error correction encoder, the variable symbol generator and the variable spreader, *that selects respective combinations of coding rate, signal constellation and spreading code applied to the respective bitstreams* such that the spread symbol streams transmitted from the network station are spread according to mutually orthogonal spreading codes.

In rejecting Claim 1, the Office Action asserts that an encoding section 43 shown in FIGs. 6, 14, and 16 of Sakoda corresponds to the recited variable error correction encoder of Claim 1. Office Action, p. 2. However, the encoding section 43 appears to be a *fixed*, i.e., not variable, encoder. In particular, the encoding section appears to always apply a single rate (½) convolutional code to the bitstream 41 applied to it.

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See Sakoda, col. 10, lines 26-44. Accordingly, Sakoda does not teach or suggest "a variable error correction encoder that error correction encodes respective bitstreams for respective ones of the plurality of terminals according to respective selected coding rates of a plurality of coding rates."

The Office Action also asserts that a symbol mapping section 48 shown in FIGs. 6, 14 and 16 of Sakoda corresponds to the recited variable symbol generator of Claim 1. Office Action, p. 2. However, the symbol mapping section 48 appears to apply a *fixed*, *i.e.*, not variable, symbol mapping. In particular, the symbol mapping second appears to always apply binary phase shift keying (BPSK) modulation, i.e., one first order symbol mapping. *See* Sakoda, col. 10, line 3. No other modulation (*i.e.*, symbol mapping) is disclosed or suggested. Accordingly, Sakoda also does not disclose or suggest "a variable symbol generator that maps respective ones of the error correction coded bitstreams to respective symbol streams according to respective signal constellations of a plurality of signal constellations of various orders."

The Office Action further asserts that a control section 42 shown in FIGs. 6 and 16 of Sakoda corresponds to the recited controller of Claim 1. However, as clearly shown in these figures from Sakoda, the control section 42 only controls a buffer 41, a spread code generating section 45, and a transmitting circuit 49. Although the control section 42 does appear to be capable of selecting from among various spreading codes, it does not appear to be operative to select "respective combinations of *coding rate, signal constellation and spreading code* applied to the respective bitstreams." Accordingly, Sakoda also fails to disclose or suggest these recitations of Claim 1.

In light of at least the foregoing reasons, it is clear that Sakoda fails to disclose or suggest several recitations of independent Claim 1. Accordingly, Applicant submits that independent Claim 1 is patentable over Sakoda.

Independent Claim 16 recites:

> A communications system, comprising:
> an error correction encoder that error correction encodes a bitstream according to an error correction code;
> a *variable symbol generator that generates a symbol from a group of bits of the error correction encoded bitstream according to a selected one of the plurality of selectable signal constellations*;
> a spreader that spreads the symbol according to a spreading code; and

a transmitter that transmits the spread symbol in a communications medium.

As discussed above, Sakoda does not disclose or suggest such a variable symbol generator. Accordingly, Sakoda does not disclose or suggest all of the recitations of independent Claim 16 and, for at least these reasons, Applicant submits that independent Claim 16 is patentable over Sakoda. Applicant submits that independent Claim 67 is patentable over Sakoda for at least similar reasons.

Independent Claim 45 recites:

> A communications system, comprising:
> an error correction encoder that encodes a bitstream according to an error correction code;
> *a symbol generator that generates respective symbols according to a signal constellation from respective groups of bits of the encoded bitstream such that a first bit position of the groups of bits correlates to clusters of signal plane constellation points of the signal constellation and a second bit position of the groups of bits correlates to relative positions within the clusters of constellation points;*
> a spreader that spreads the symbols produced by the symbol generator; and
> a transmitter that transmits the spread symbols in a communications medium.

In rejecting Claim 45, the Office Action provides no indication as to where Sakoda discloses or suggests the highlighted recitations. *See* Office Action pp. 2 and 3. In fact, the grounds provided by the Office Action in rejecting Claim 45 appear to only refer to recitations of Claim 1. Moreover, Applicant submits that the above-highlighted recitations of Claim 45 are neither disclosed nor suggested in Sakoda. Accordingly, Sakoda does not disclose or suggest all of the recitations of independent Claim 45 and, for at least these reasons, Applicant submits that independent Claim 45 is patentable over Sakoda. Applicant submits that independent Claim 90 is patentable over Sakoda for at least similar reasons.

Independent Claim 48 recites:

> A receiving station, comprising:
> a receiver that receives a communications signal from a communications medium;
> a despreader that despreads the received signal according to a spreading code;

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a symbol estimator that generates a symbol estimate from the despread signal; and

a variable decoder that decodes the symbol estimate according to a selected combination of an error correction code and a signal constellation of a plurality of selectable signal constellations.

In rejecting Claim 48, the Office Action equates the decoding sections 68, 95, and 127 in FIGs. 8, 12, and 15 with the recited variable decoder. However, nowhere does Sakoda disclose or suggest that these decoding sections 68, 95, and 127 decode a symbol estimate "according to a selected combination of an error correction code and a signal constellation of a plurality of selectable signal constellations." Accordingly, Sakoda does not disclose or suggest all of the recitations of independent Claim 48 and, for at least these reasons, Applicant submits that independent Claim 48 is patentable over Sakoda. Applicant further submits that independent Claim 93 is patentable over Sakoda for at least similar reasons.

Independent Claims 55, 62 and 65 are patentable over Willming

Independent Claims 55, 62, and 65 stand rejected under 35 U.S.C. § 102 as anticipated by U.S. Patent No. 5,923,711 to Willming (hereinafter "Willming"). Applicant respectfully traverses these rejections, as the subject matter described in Willming bears little or no relevance to the subject matter of Claims 55, 62, and 65, i.e., is not relevant to the spreading code processing recited in these claims.

Claim 55 recites:

A method of communicating a bitstream, comprising:
modulo-2 adding __each bit of a binary spreading code__ of length N in turn to a first group of bits of the bitstream to generate a revised first group of bits;
generating a first symbol from the revised first group of bits using a signal constellation that maps the first group of bits and a complement of the first group of bits to diametrically opposite constellation points; and
transmitting the first symbol in a communications medium.

In rejecting Claim 55, the Office Action asserts that elements 54 and 62 provide the recited modulo-2 addition function. However, the cited passage from Willming (col. 5, lines 32-67) describing the functions of these elements clearly lacks any mention of such operations on a *spreading code*. In fact, the subject matter described in Willming has nothing to do with spreading codes and spread-spectrum modulation.

Rather, Willming deals with multilevel modulated signals, in particular, signals used in HDTV transmission, not CDMA spread spectrum communications signals. *See* Willming, cols. 1 and 3. Accordingly, Willming neither discloses nor suggests the recitations of independent Claim 55 and, for at least these reasons, Applicant submits that independent Claim 55 is patentable over Willming.

Independent Claim 62 recites:

> A method of applying *spreading codes* to a signal using multi-bit complex symbols of a complex signal constellation, the constellation including at least one sub-group of constellation points that are equally-spaced in angle over 360 degrees by a given angular increment, the method comprising:
> *selecting a sequence of N phase rotation values from a set of phase rotations substantially equally spaced over 360 degrees by the angular increment to form a phase-rotational spreading code;*
> *generating groups of bits for transmission to be represented by the multi-bit complex symbols using a bit-to-symbol mapping in which no sub-group of bits forming a symbol has an arithmetic value indicative of the angular position of the symbol;*
> *translating respective ones of the generated groups of bits to respective bit patterns using a one-to-one mapping such that given sub-groups of bits in the bit patterns have an arithmetic value indicative of the angular position of the symbol; and*
> *modifying the given subgroups in the bit patterns using each of the sequence of N phase rotation values to form, for each bit pattern, N rotated symbols.*

In rejecting Claim 62, the Office Action provides no indication as to where any of the highlighted recitations are taught or suggested by Willming. In fact, the grounds stated in rejecting Claim 62 appear only to refer to recitations from Claim 55. For at least this reason, the rejection of independent Claim 62 should be withdrawn. In addition, as noted above, Willming is not directed to spread spectrum signal processing techniques and, therefore, bears little or no relevance to the subject matter recited in independent Claim 62. Accordingly, Applicant submits that independent Claim 62 is patentable over Willming.

Independent Claim 65 recites:

> In a **CDMA** communications system employing orthogonal *spreading codes*, a method of controlling use of the orthogonal spreading codes, comprising:
> selecting a group of recipients to share one of the orthogonal spreading codes;

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> *representing respective groups of sequential bits for respective ones of the group of recipients by respective multi-bit symbols of a signal constellation;*
>
> *repeating a respective one of the multi-bit symbols using the corresponding group of bits a respective number of times associated with the respective recipient; and*
>
> *scrambling the repeated multi-bit symbols according to an orthogonal spreading code selected from a set of orthogonal spreading codes.*

As with the rejection of Claim 62, the Office Action provides no indication as to where any of the highlighted recitations of Claim 65 are taught or suggested by Willming. As with the rejection of Claim 62, the stated grounds appear only to refer to recitations of Claim 55. For at least this reason, the rejection of independent Claim 65 should be withdrawn. In addition, as noted above, Willming is not directed to CDMA (*i.e.*, spread spectrum) signal processing techniques and, therefore, bears little or no relevance to the subject matter recited in independent Claim 65. Accordingly, Applicant submits that independent Claim 65 is patentable over Willming.

The dependent claims are patentable

Applicant submits that dependent Claims 2-15, 17-44, 46, 47, 49-54, 56-61, 63, 64, 66, 68-89, 91, 92, and 94-96 are patentable at least by virtue of depending from various ones of patentable independent Claims 1, 16, 45, 48,55, 62, 65, 67, 90 and 93. Applicant further submits that many of the dependent claims are separately patentable.

In many cases, the Office Action repeatedly provides as basis for the various rejections of the dependent claims that the various recitations of the dependent claims are "inherently included" in Sakoda or Willming, with no specific indication as to why or where such recitations would be "inherent" in these references. Respectfully, this is not supportable under the legal standards for inherency. "To establish inherency, the extrinsic evidence must make clear that the missing descriptive matter *is necessarily present* in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. " M.P.E.P. § 2112 (citations omitted) (emphasis added). In each of the rejections in which inherency is alleged, the Office Action fails to provide any such evidence.

Moreover, many of the allegations of inherency are clearly erroneous. For example, in rejecting Claim 9, the Office Action states "Sakoda inherently includes wherein the plurality of signal constellations comprises at least one of a QPSK modulation, an offset QPSK constellation, an MPSK constellation, and an M-QAM constellation." Office Action, p. 4. However, Sakoda fails to disclose or suggest any of these modulations; as noted above, Sakoda appears to mention only BPSK modulation.

The Office Action also provides erroneous bases for those rejections of the dependent claims that do have specific citations to the references. For example, in rejecting Claim 14, the Office Action cites col. 9, lines 48-55 as teaching:

> . . . wherein respective ones of the combinations of orthogonal spreading code and the common scrambling code are respective multiplicative combinations, and wherein the variable spreader complex multiplies respective ones of the symbol streams by the respective multiplicative combinations *such that one of four phase changes in steps of ninety degrees is provided for each symbol repeat produced.*
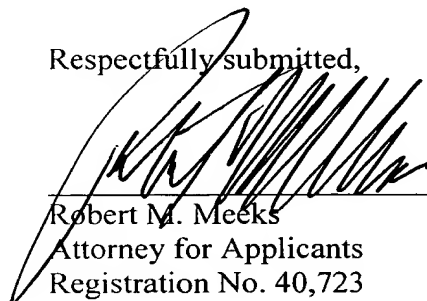
However, the cited passage from Sakoda says nothing about, for example, the highlighted recitations relating to phase changes for symbol repeats. For at least this reason, Claim 14 is separately patentable over Sakoda.

Conclusion

Applicant respectfully requests reconsideration and withdrawal of the rejections of the claims for at least the reasons discussed above. Applicant further requests allowance of the claims and passing of the application to issue with all due speed. Applicant encourages the Examiner to contact the undersigned by telephone to address any remaining issues.

Respectfully submitted,

Dated: June 4, 2004

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